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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE



# TRANSMITTAL FORM

*(to be used for all correspondence after initial filing)*

| | |
|---|---|
| Total Number of Pages in This Submission | 19 |
| Application Number | 10/505,438 |
| Filing Date | August 24, 2004 |
| First Named Inventor | Tetsuro ASANO |
| Art Unit | 2814 |
| Examiner Name | A. D. Mai |
| Attorney Docket Number | 492322017400 |

## ENCLOSURES (*Check all that apply*)

- [x] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) ______
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [x] Appeal Communication to TC (**Appeal Notice, Brief, Reply Brief**)
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below):

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Remarks

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | | | |
|---|---|---|---|
| Firm Name | MORRISON & FOERSTER LLP | | |
| Signature | [signature] | | |
| Printed name | Barry E. Bretschneider | | |
| Date | January 31, 2007 | Reg. No. | 28,055 |

PTO/SB/17 (07-06)
Approved for use through 01/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office. U.S. DEPARTMENT OF COMMERCE


*Effective on 12/08/2004.*
*Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).*

# FEE TRANSMITTAL
## For FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

| TOTAL AMOUNT OF PAYMENT | ($) 500.00 |
|---|---|

| Complete if Known | |
|---|---|
| Application Number | 10/505,438 |
| Filing Date | August 24, 2004 |
| First Named Inventor | Tetsuro ASANO |
| Examiner Name | A. D. Mai |
| Art Unit | 2814 |
| Attorney Docket No. | 492322017400 |

**METHOD OF PAYMENT** (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): ______

☒ Deposit Account Deposit Account Number: 03-1952 Deposit Account Name: Morrison & Foerster LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

**FEE CALCULATION**

**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

| | FILING FEES | | SEARCH FEES | | EXAMINATION FEES | | |
|---|---|---|---|---|---|---|---|
| **Application Type** | **Fee ($)** | **Small Entity Fee ($)** | **Fee ($)** | **Small Entity Fee ($)** | **Fee ($)** | **Small Entity Fee ($)** | **Fees Paid ($)** |
| Utility | 300 | 150 | 500 | 250 | 200 | 100 | |
| Design | 200 | 100 | 100 | 50 | 130 | 65 | |
| Plant | 200 | 100 | 300 | 150 | 160 | 80 | |
| Reissue | 300 | 150 | 500 | 250 | 600 | 300 | |
| Provisional | 200 | 100 | 0 | 0 | 0 | 0 | |

**2. EXCESS CLAIM FEES**

| **Fee Description** | **Fee ($)** | **Small Entity Fee ($)** |
|---|---|---|
| Each claim over 20 (including Reissues) | 50 | 25 |
| Each independent claim over 3 (including Reissues) | 200 | 100 |
| Multiple dependent claims | 360 | 180 |

**Total Claims** ______ - 20 = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______

HP = highest number of total claims paid for, if greater than 20.

**Multiple Dependent Claims** **Fee ($)** ______ **Fee Paid ($)** ______

**Indep. Claims** ______ - 3 = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______

HP = highest number of independent claims paid for, if greater than 3.

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

**Total Sheets** ______ - 100 = **Extra Sheets** ______ /50 **Number of each additional 50 or fraction thereof** ______ (round up to a whole number) x **Fee ($)** ______ = **Fee Paid ($)** ______

**4. OTHER FEE(S)** **Fees Paid ($)**

Non-English Specification, $130 fee (no small entity discount)

Other (e.g., late filing surcharge): 1402 Filing a brief in support of an appeal 500.00

| SUBMITTED BY | | | | | |
|---|---|---|---|---|---|
| Signature | [signature] | Registration No. (Attorney/Agent) | 28,055 | Telephone | (703) 760-7743 |
| Name (Print/Type) | Barry E. Bretschneider | | | Date | January 31, 2007 |

va-191649

PATENT
Docket No. 492322017400

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

| | |
|---|---|
| In the application of: | Examiner: Anh D. Mai |
| Tetsuro ASANO *et al.* | Group Art Unit: 2814 |
| Serial No.: 10/505,438 | Confirmation No.: 2447 |
| Filing Date: August 24, 2004 | |
| For: PROTECTING ELEMENT | |

## APPELLANTS' OPENING BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is a timely appeal from the final rejection of claims 20-42 in this application.

## I. REAL PARTY IN INTEREST

The real party in interest is Sanyo Electric Co., Ltd., of Osaka, Japan, the assignee of appellants' entire, right, title and interest in this application.

## II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences within the meaning of 37 CFR 41.37(c)(1)(ii) known to appellants or their undersigned counsel.



## III. STATUS OF CLAIMS

Claims 20-42 (reproduced in the attached Appendix), which are under final rejection, are pending in this application.

Claims 20-38 have been rejected under 35 USC 112, first paragraph, for lack of written description.

Claims 32, 37 and 39-42 have been rejected under 35 USC 112, first paragraph, for lack of written description.

Claims 32, 37 and 39-42 have been rejected under 35 USC 112, second paragraph, as indefinite.

Claims 20-38 have been rejected under 35 USC 112, second paragraph, as indefinite.

Claims 20, 24-31, 34, 36 and 38 have been rejected under 35 USC 102(b) as anticipated by Asano.

Claims 21, 23, 33 and 35 have been rejected under 35 USC 103(a) as unpatentable over Asano.

Claims 20-42 are on appeal.

## IV. STATUS OF AMENDMENTS

Appellants filed a Preliminary Amendment to cancel claims 1-19 and add claims 20-42, when appellants filed this national stage application on August 24, 2004. Appellants also filed an Amendment Under 37 CFR 1.111 on June 1, 2006. The claims on appeal stand as amended in the Amendment filed June 1, 2006.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

This invention is a protecting element integrated in a substrate of a device so that the device is protected from inadvertent application of electrostatic energy. The basic structure of the protecting element is shown in FIGS. 1, 2A and 4A and described at page 4, line 9 - page 6, line 1, of the specification. A first high concentration impurity region 201 is formed in an insulating region 203 of a substrate 101 and connected to a first terminal GP of a MESFET 100 formed in the substrate 101. A second high concentration impurity region 202 is formed in the insulating region 203 and connected to a second terminal SP/DP of the MESFET 100. The first and second high concentration impurity regions 201 and 202 face each other with a portion of the insulating region 203 is disposed between them, as shown in FIG. 2A.

Discharging of electrostatic energy applied between the first and second terminals is shown in FIGS. 12 and 16B and described at page 20, lines 3-29, and page 20, lines 21-27, of the specification. The width $\alpha 1$ of the first high concentration impurity region 201 is configured so that upon the discharging a current path I2 is formed in the insulating region 203 from the outer side surface of the first high concentration impurity region 201 to the second high concentration impurity region 202, in addition to the current path I1 that is formed between the inner side surfaces of the first and second high concentration impurity regions 201 and 202. The outer side surface of the first high concentration impurity region 201 is opposite from the inner side surface OS of the first high concentration impurity region 201 that faces that portion of the insulating region 203. The inner side surface OS of the first high concentration impurity region 201 overlaps at least partially with the inner side surface OS of the second high concentration impurity region 202 so that that portion of the insulating region 203 is disposed between the overlapping inner side surfaces OS. This overlapping of the inner side surfaces OS of the first and second high concentration impurity regions 201 and 202 is shown in FIGS. 1, 2A, 4A, 12 and 16B, for example.

The current path I2 may expand, not only into the depth direction of the substrate 101 as shown in FIG. 16B, but also into the lateral direction of the substrate 101 as shown FIGS. 19C, 21B and 23A. The distance $\beta$ in the direction of the flow of electric current between the outer side surface of the first high concentration impurity region 201 and the edge of the insulating region 203 closest to the first high concentration impurity region 201 is 10 μm or larger, as shown in FIGS. 19C and 21B. The distance $\gamma$ in the direction normal to the flow of electric current between the branch portion 300 of the first high concentration impurity region 201 and the edge of the insulating region 203 closest to the first high concentration impurity region 201 is 10 μm or larger. See page 27, line 10 - page 32, line 2, of the specification.

The device protected by the protecting element may be an element comprising a Schottky junction as shown in FIGS. 4A-4C, an element comprising a PN junction as shown in FIGS. 8A-8C or a capacitor as shown in FIGS. 9A-9C.

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 20-38 are supported by a written description in the specification under 35 USC 112, first paragraph.

Whether claims 32, 37 and 39-42 are supported by a written description in the specification under 35 USC 112, first paragraph.

Whether claims 32, 37 and 39-42 are definite under 35 USC 112, second paragraph.

Whether claims 20-38 are definite under 35 USC 112, second paragraph.

Whether claims 20, 24-31, 34, 36 and 38 are anticipated under 35 USC 102(b) by Asano.

Whether claims 21, 23, 33 and 35 are patentable under 35 USC 103(a) over Asano.

## VII. ARGUMENT

### A. THE EXAMINER FAILED TO READ THE DISCLOSURES OF THE APPLICATION PROPERLY WHEN REJECTING CLAIMS 20-38 UNDER 35 USC 112, FIRST PARAGRAPH.

Claim 20 states that the inner side surface of the first high concentration region overlaps at least partially with an inner side surface of the second high concentration region so that the portion of the insulating region is disposed between the inner side surfaces. In the Final Rejection dated September 18, 2006, the Examiner contended that this claim limitation is not supported by the disclosures of the application because "the first and second high concentration 201 and 202 do not overlap, not even partially." See paragraph 6 of the Final Action.

In the second paragraph of section V above, appellants have already explained this feature of the claimed invention based on the disclosures of this application. FIGS. 1, 2A-4A, 5A-7A, 8A, 9A, 9B, 10A, 12, 16A, 16B, 19C, 21B, 22A, 23A, 24 and 25 all show the claimed overlapping of the first and second high concentration regions 201 and 202. For example, FIG. 12 shows the two inner side surfaces that oppose each other as "OS." See page 18, line 29 - page 19, line 3, of the specification. The right hand one of the two "OS" inner surfaces is the inner surface of the first high concentration region 201, and the left hand one of the two "OS" inner surfaces is the inner surface of the second high concentration region 202. Considering the plan view of the claimed protecting element, such as the view shown in FIG. 1, the inner surface OS

of the first high concentration region 201 overlaps at least partially with the inner side surface OS of the second high concentration region 202 so that the portion between the two regions 201 and 202 is disposed between the inner side surfaces as claimed.

The Examiner's conclusory statement that they "do not overlap, not even partially" does not make sense in the face of the disclosures explained above. Thus, claims 20-38 are supported by the disclosure of the specification.

### B. THE EXAMINER FAILED TO CONSTRUE THE CLAIMS REASONABLY UNDER *CORTRIGHT* WHEN REJECTING CLAIMS 32, 37 AND 39-42 UNDER 35 USC 112, FIRST PARAGRAPH.

Claim 32 states that the distance between the outer side surface of the first high concentration impurity region, which is opposite from the inner side surface of the first high concentration impurity region that faces the portion of the insulating region, and the edge of the insulating region closest to the first high concentration impurity region is 10 μm or larger. Claim 37 states that the distance between the side surface of the branch portion of the first high concentration impurity region and the edge of the insulating region closest to the branch portion is 10 μm or larger.

In the third paragraph of section V above, appellants have already explained that the claimed 10 μm clearance with respect to the outer side surface of the first high concentration impurity region 201 corresponds to the distance β shown in FIG. 21A, and the claimed 10 μm clearance with respect to the branch portion 300 of the first high concentration impurity region 201 corresponds to the distance γ shown in FIG. 23A. The Examiner contends that these claim limitations are not supported by the disclosure of the specification because "the distance between the side surface of the branch portion or the outer side surface of the first high concentration impurity region and the edge of the insulating region closest to the first high concentration impurity region is the <u>interface</u> between them, thus, 0 μm not 10 μm or longer." (Emphasis in original). See paragraph 7 of the Final Action.

"Although the PTO must give claims their broadest reasonable interpretation, this interpretation must be consistent with the one that those skilled in the art would reach." *In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999). The Examiner construed the claim language "the edge of the insulating region closest to the first high concentration impurity region" to mean the portion of the insulating region in contact with the first high concentration impurity region itself. This construction is not a reasonable interpretation that persons skilled in the art would reach. First, persons skilled in the art would understand that the portion of the insulating region that is in contact with the first high concentration impurity region cannot be the claimed edge of the insulating region, because such an interpretation would make meaningless the express claim limitation that the distance from the edge is 10 μm or longer. Second, based on the descriptions in the specification explained above, persons skilled in the art would understand that the distance in claim 32 corresponds to the distance β shown in FIG. 21A and the distance in claim 37 corresponds to the distance γ shown in FIG. 23A. In other words, the claimed edge is the part of the contour of the insulating region that is closest to the first high concentration impurity region, and these claims define the minimum distance between that edge and the side surfaces. The Examiner's argument fails because when the claims are construed under *Cortright*, they are supported by the disclosure of the specification.

The rejection of claims 39-42 relies on the same "interface" argument and thus is not proper under *Cortright*. Under the proper claim interpretation, claims 32, 37 and 39-42 are supported by the disclosure of the specification.

### C. CLAIMS 32, 37 AND 39-42 ARE NOT INDEFINITE UNDER 35 USC 112, SECOND PARAGRAPH WHEN THE CLAIMS ARE REND IN LIGHT OF THE DISCLOSURE OF THE <u>SPECIFICATION.</u>

In this indefiniteness rejection, the Examiner contended that the claims are indefinite because "[a]s discussed above, the interface has no thickness." See paragraph 7 of the Final Action. As explained in subsection B in this section above, the Examiner misconstrued claims 32, 37 and 39-42. The Examiner relies on the same erroneous claim interpretation as used in the written description rejection to reject the claims, alleging the indefiniteness of the same claim term the Examiner interpreted.

Based on the disclosures of this application persons skilled in the art would understand that the claimed edge of the insulating region corresponds to the part of the contour of the insulating region that is closest to the first high concentration impurity region, in other words, the part of the contour located at the minimum distance from the first high concentration impurity region, as explained above. There is no lack of clarity of claim scope here. Thus, claims 32, 37 and 39-42 are not indefinite.

### D. THE EXAMINER FAILED TO CONSTRUE THE CLAIMS PROPERLY UNDER *PHILLIPS* WHEN REJECTING CLAIMS 20-<u>38 UNDER 35 USC 112, SECOND PARAGRAPH.</u>

In this indefiniteness rejection, the Examiner stated "if two regions are deem overlap then nothing is between them. Therefore, the claims are indefinite." See paragraph 9 of the Final Action. The Examiner's interpretation of the term "overlap" is not a reasonable one that persons skilled in the art would reach. "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Claim 20 states that "the inner side surface of the first high concentration region overlaps at least partially with an inner side surface of the second high concentration region <u>so that the portion of the insulating region is disposed between the inner side surfaces</u>." (Emphasis added). Read in the context of claim 20, the claimed overlapping of the first and second high concentration regions must leave space between

the inner side surfaces of the two regions so that part of the insulating region is disposed between them. That is, the insulating region, not "nothing" as asserted by the Examiner, is between them.

The specification explains that under the normal operation of the protected device element, such as an FET, no signal passes between the two high concentration regions and that when a high voltage is applied instantaneously to the FET, a current path is temporarily formed between the two regions. See page 5, lines 3-12, of the specification. If the first and second high concentration regions were to be in contact as the Examiner alleges, the FET would fail to operate because of the improper signal pass permanently created by the alleged contact. Thus, persons skilled in the art would not interpret the term "overlap" to allow a contact of the two regions (so that "nothing is between them") but would interpret the term to require space between the two regions to accommodate the insulating region.

Furthermore, the plain meaning of the term "overlap" is "to extend over or pass and cover a part of." Merriam-Webster's Collegiate Dictionary at 827 (3d Ed. 2002). Nothing in the plain meaning of the term requires contact when two regions overlap.

The Examiner's indefiniteness rejection is not proper because of misconstruction of the claim term alleged to be indefinite.

### E. THE EXAMINER FAILED TO FIND ALL ELEMENTS OF CLAIM 20 UNDER *RICHARDSON* WHEN REJECTING CLAIMS 20, 24-31, 34, 36 AND 38 UNDER 35 USC 102(b) ON U.S. PATENT PUBLICATION NO. 2002/0047177 (ASANO).

The standard for the anticipation analysis is that "[e]very element of the claimed invention must be literally present, arranged as in the claim. ... The identical invention must be shown in as complete detail as is contained in the patent claim." *Richardson v. Suzuki Motor Co., Ltd.*, 868 F.2d 1226, 1236 (Fed. Cir. 1983).

Claim 20 states that the inner side surface of the first high concentration region overlaps at least partially with the inner side surface of the second high concentration region so that the portion of the insulating region is disposed between the inner side surfaces. Asano simply fails to disclose the limitation of the overlapping high concentration regions. The Examiner addressed

the deficiency of this rejection at paragraph 12 of the Final Rejection and stated "With respect to claim 20, as seen above, there is no overlap between the impurity regions." Appellants fail to see the point the Examiner was making by this statement. Was the Examiner saying that this element of claim 20 cannot be relied on to show a patentable distinction because that element is indefinite or lacks a written description? If so, such an argument does not belong in an anticipation analysis. In any event, the Examiner in effect admitted that the claimed overlapping configuration is not disclosed by Asano. Under *Richardson*, this anticipation rejection fails.

### E. THE EXAMINER'S REJECTION OF CLAIMS 21, 23, 33 AND 35 UNDER 35 USC 103(a) OVER U.S. PATENT PUBLICATION NO. 2002/0047177 (ASANO) FAILS BECAUSE THE CLAIMS DEPEND FROM CLAIM 20.

Claims 21, 23, 33 and 35 are patentable inasmuch as claim 20 is patentable as explained above. Asano does not disclose the feature on which this obviousness rejection relies.

## CONCLUSION

For the foregoing reasons, the Board should reverse the written description rejection of claims 20-38, the written description rejection of claims 32, 37 and 39-42, the indefiniteness rejection of claims 32, 37 and 39-42, the indefiniteness rejection of claims 20-38, the anticipation rejection of claims 20, 24-31, 34, 36 and 38, and the obviousness rejection of claims 21, 23, 33 and 35.

In the event that the transmittal letter is separated from this document and the Patent and Trademark Office determines that an extension and/or other relief is required, appellants petition

for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. **492322017400**.

Respectfully submitted,

Dated: January 31, 2007

By: ______________________________

Barry E. Bretschneider
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## APPENDIX OF CLAIMS ON APPEAL

20. A protecting element comprising:

a first high concentration impurity region formed in an insulating region of a substrate and connected to a first terminal of an element formed in the substrate; and

a second high concentration impurity region formed in the insulating region and connected to a second terminal of the element, the first and second high concentration impurity regions facing each other with a portion of the insulating region disposed therebetween,

wherein a width of the first high concentration impurity region is configured so that upon discharging of electrostatic energy applied between the first and second terminals a current path is formed in the insulating region from an outer side surface of the first high concentration impurity region to the second high concentration impurity region, the outer side surface of the first high concentration impurity region being opposite from an inner side surface of the first high concentration impurity region that faces the portion of the insulating region, and

the inner side surface of the first high concentration region overlaps at least partially with an inner side surface of the second high concentration region so that the portion of the insulating region is disposed between the inner side surfaces.

21. The protecting element of claim 20, wherein the width of the first high concentration impurity region is 5 μm or smaller.

22. The protecting element of claim 20, wherein a width of the second high concentration impurity region is configured so that upon the discharging of the electrostatic energy applied between the first and second terminals the current path from the outer side surface of the first high concentration impurity region reaches an outer side surface of the second high concentration impurity region, the outer side surface of the second high concentration impurity region being opposite from an inner side surface of the second high concentration impurity region that faces the portion of the insulating region.

23. The protecting element of claim 22, wherein the width of the first high concentration impurity region and the width of the second high concentration impurity region are 5 μm or smaller.

24. The protecting element of claim 20, wherein a separation of the first and second high concentration impurity regions is 10 μm or smaller.

25. The protecting element of claim 20, wherein a separation of the first and second high concentration impurity regions is 4 μm or larger.

26. The protecting element of claim 20, wherein an impurity concentration of the insulating region is $1 \times 10^{14}$ $cm^{-3}$ or lower.

27. The protecting element of claim 20, wherein a volume resistivity of the insulating region is $1 \times 10^{3}$ Ω·cm or higher.

28. The protecting element of claim 20, wherein the insulating region is configured to provide an additional current path upon the discharging between the inner side surface of the first high concentration impurity region and an inner side surface of the second high concentration impurity region and between bottom surfaces of the first and second high concentration impurity regions.

29. The protecting element of claim 20, wherein the first high concentration impurity region comprises a branch portion that does not face the second high concentration impurity region and is configured to provide upon the discharging an additional current path in the insulating region between the branch portion and the second high concentration impurity region.

30. The protecting element of claim 28, wherein the current path has a higher conductivity modulation than the additional current path.

31. The protecting element of claim 28, wherein a current running through the current path upon the discharging is greater than a current running through the additional current path upon the discharging.

32. The protecting element of claim 20, wherein a distance between the outer side surface of the first high concentration impurity region and an edge of the insulating region closest to the first high concentration impurity region is 10 μm or larger.

33. The protecting element of claim 20, wherein a distance between a bottom surface of the first high concentration impurity region and a bottom surface of the insulating region is 20 μm or larger.

34. The protecting element of claim 20, wherein the current path expands when the electrostatic energy applied between the first and second terminals becomes larger.

35. The protecting element of claim 20, wherein a capacitance between the first and second high concentration impurity regions is 40 fF or smaller, and the element has a strength against electrostatic discharge at least 10 times as large as that of the element without the first and second high concentration impurity regions.

36. The protecting element of claim 29, wherein the additional current path has a higher conductivity modulation than the current path.

37. The protecting element of claim 29, wherein a distance between a side surface of the branch portion and an edge of the insulating region closest to the branch portion is 10 μm or larger.

38. The protecting element of claim 29, wherein the additional current path expands when the electrostatic energy applied between the first and second terminals becomes larger.

39. A protecting element comprising:

a first high concentration impurity region formed in an insulating region; and

a second high concentration impurity region formed in the insulating region,

wherein the first high concentration impurity region is connected to a first terminal of an element comprising a PN junction or a Schottky junction, the second high concentration impurity region is connected to a second terminal of the element,

the first and second high concentration impurity regions in the insulating region are positioned so that an electrostatic energy applied between the first and second terminals is at

least partially discharged by a flow of electric current in the insulating region between the first and second high concentration impurity regions, and

a distance in the direction of the flow of electric current between the first high concentration impurity region and an edge of the insulating region closest to the first high concentration impurity region is 10 μm or larger.

40. A protecting element comprising:

a first high concentration impurity region formed in an insulating region; and

a second high concentration impurity region formed in the insulating region,

wherein the first high concentration impurity region is connected to a first electrode of a capacitor, the second high concentration impurity region is connected to a second electrode of the capacitor,

the first and second high concentration impurity regions in the insulating region are positioned so that an electrostatic energy applied between the first and second terminals is at least partially discharged by a flow of electric current in the insulating region between the first and second high concentration impurity regions, and

a distance in the direction of the flow of electric current between the first high concentration impurity region and an edge of the insulating region closest to the first high concentration impurity region is 10 μm or larger.

41. A protecting element comprising:

a first high concentration impurity region formed in an insulating region; and

a second high concentration impurity region formed in the insulating region,

wherein the first high concentration impurity region is connected to a first terminal of an element comprising a PN junction or a Schottky junction, the second high concentration impurity region is connected to a second terminal of the element,

the first and second high concentration impurity regions in the insulating region are positioned so that an electrostatic energy applied between the first and second terminals is at

least partially discharged by a flow of electric current in the insulating region between the first and second high concentration impurity regions, and

a distance in the direction normal to the flow of electric current between the first high concentration impurity region and an edge of the insulating region closest to the first high concentration impurity region is 10 μm or larger.

42. A protecting element comprising:

a first high concentration impurity region formed in an insulating region; and

a second high concentration impurity region formed in the insulating region,

wherein the first high concentration impurity region is connected to a first electrode of a capacitor, the second high concentration impurity region is connected to a second electrode of the capacitor,

the first and second high concentration impurity regions in the insulating region are positioned so that an electrostatic energy applied between the first and second terminals is at least partially discharged by a flow of electric current in the insulating region between the first and second high concentration impurity regions, and

a distance in the direction normal to the flow of electric current between the first high concentration impurity region and an edge of the insulating region closest to the first high concentration impurity region is 10 μm or larger.

# EVIDENCE APPENDIX

**[NONE.]**

## RELATED PROCEEDINGS APPENDIX

**[NONE.]**